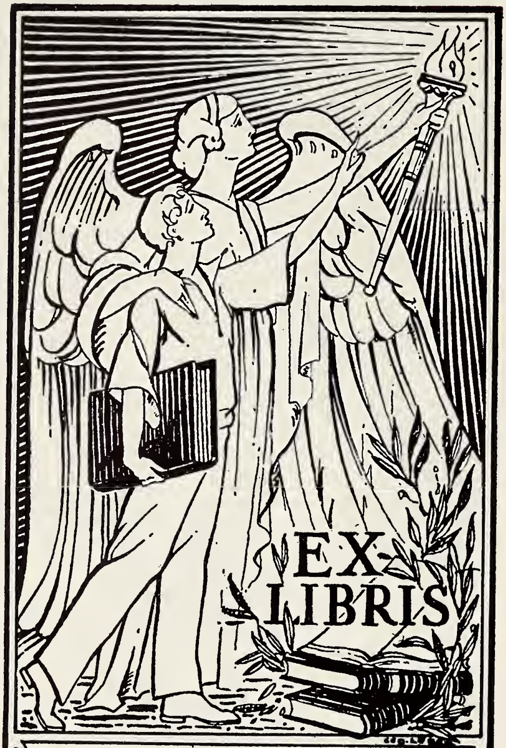
NIGHT-BLINDNESS IN NEWFOUNDLAND

HV 2330

HV 2330

HV2330
.N54
1928



AMERICAN FOUNDATION
FOR THE BLIND INC.

laboratory conditions yet are found to be undesirable in clinical practice.

NATURAL FOOD PIGMENTS

Probably the most obvious and yet the least considered of the properties of the human dietary, taken as a whole, is its color. The blue, red, yellow and orange of fruits, the green, red and yellow of vegetables, and the brown and red of meats are so well identified with those foods which provide the better known dietary essentials that these pigments are taken as a matter of course. An attempt to devise a colorless experimental ration is attended with so much difficulty that one is readily convinced of the ubiquity of natural food pigments. Efforts have been made to evaluate the physiologic significance of the pigments that have been recognized as chemical entities, but it would appear that until recently hemoglobin has been the only naturally occurring coloring substance in foods whose function has been even roughly defined. There is evidence that when taken by mouth it has value as raw material from which the body can make new blood pigment. On the other hand, chlorophyll, which is somewhat similar chemically, cannot be classed as a substance unequivocally favorable to hematopoiesis. The available evidence does not attribute any proved function for the other food pigments, with the notable recently discovered exception of carotin.

in which dogs were fed a restricted ration for some months until they developed indications of marked malnutrition characterized by lesions in the mouth and along the gastro-intestinal tract. They found that the syndrome could be prevented and cured by food materials rich in carotin and finally showed that as little as 5 mg. daily of crystallized carotin was efficacious. In view of the well controlled conditions of the experiment, the results indicate an extraordinary potency of this pigment or some substance closely associated therewith and a definite need for it on the part of the organism. Experiments of a somewhat different nature, carried out with guinea-pigs, have been reported from Harvard.[2] In this case a solution of carotin in olive oil was injected intraperitoneally with the result that, at necropsy a month after the injections were begun, granulomatous lesions were found in the mesentery, on the spleen and on the liver. They were yellow fatty masses, and the whole phenomenon seemed characteristic of a foreign body type of reaction in the tissues. Small nodules were likewise seen on the under side of the omentum and seemed to follow the lymphatic vessels. A control animal injected with olive oil alone showed none of these reactions.

These two studies suggest several possibilities as explanation of the observed facts. There may be a specific difference between the two groups of animals.

---

1. Underhill, F. P., and Mendel, L. B.: Am. J. Physiol. **83:** 589 (Jan.) 1928. An Experimental Deficiency Disorder, editorial, J. A. M. A. **90:** 1119 (April 7) 1928.

2. Connor, C. L.: Am. J. Path. **4:** 227 (May) 1928.

AMERICAN FOUNDATION
FOR THE BLIND INC.

drug should therefore be capable of disinfecting the skin efficiently within five minutes. It should also penetrate the epithelial débris that is always present. In order to do this, the solution should be capable of dissolving the fatty excretions of the skin and should therefore contain alcohol or some such solvent. The solvent should be of such a nature as to permit fairly rapid drying. It is important in preoperative skin disinfection that the substance used should stain the field in order that the treated area may be clearly defined. If a colorless solution is used there is always some doubt as to the exact extent of the area which has been covered. The disinfectant should not unduly irritate the skin of the patient. This is of great importance where the external genitalia and other sensitive regions have to be cleansed prior to operations. Many caustic and corrosive substances are excellent in killing bacteria, but, because of their severe action on the skin, they cannot be used. A great many postoperative infections have undoubtedly followed blistering by the disinfectant used in the preparation of the patient. It is desirable, finally, that the disinfectant should not be unduly toxic and should not precipitate proteins and albumins, since it frequently happens that the substance has to be instilled into the peritoneum in abdominal operations. Before judgment is passed on an antiseptic, all such points must be considered in addition to any results obtained in in vitro and laboratory tests. Many substances give excellent results under laboratory conditions yet are found to be undesirable in clinical practice.

NATURAL FOOD PIGMENTS

Probably the most obvious and yet the least considered of the properties of the human dietary, taken as a whole, is its color. The blue, red, yellow and orange of fruits, the green, red and yellow of vegetables, and the brown and red of meats are so well identified with those foods which provide the better known dietary essentials that these pigments are taken as a matter of course. An attempt to devise a colorless experimental ration is attended with so much difficulty that one is readily convinced of the ubiquity of natural food pigments. Efforts have been made to evaluate the physiologic significance of the pigments that have been recognized as chemical entities, but it would appear that until recently hemoglobin has been the only naturally occurring coloring substance in foods whose function has been even roughly defined. There is evidence that when taken by mouth it has value as raw material from which the body can make new blood pigment. On the other hand, chlorophyll, which is somewhat similar chemically, cannot be classed as a substance unequivocally favorable to hematopoiesis. The available evidence does not attribute any proved function for the other food pigments, with the notable recently discovered exception of carotin.

In addition to the green chlorophyll there occur in the leaves of plants two pigments, xanthophyll and carotin, which form yellow solutions. They can be found in other parts of the plant also and may be demonstrated in yellow corn, carrots and sweet potatoes. These pigments are similar in that their crystals are yellow, rose or copper colored with a metallic sheen. They differ in their solubilities and in their susceptibility to oxidation. Carotin is a hydrocarbon, while xanthophyll contains oxygen in addition to carbon and hydrogen. These pigments are always found together in plant and animal tissues, though in varying ratios. It has been shown that the carotin of milk fat, blood serum and adipose tissue of cattle is derived from the carotin-bearing food which they eat, while the xanthophyll, which predominates in egg yolk, in the skin of the legs of chickens and in their beaks, is present or largely absent in these structures depending on whether the fowls are given food containing xanthophyll or are provided with a ration lacking the pigment. There is a striking parallelism between the occurrence of vitamin A and these yellow pigments in nature, but careful studies have shown that neither purified xanthophyll nor carotin can replace this fat-soluble factor in the diet. The function of these commonly occurring pigments has come to be somewhat of a mystery.

Light has recently been thrown on the question by the extensive experiments of Underhill and Mendel[1] in which dogs were fed a restricted ration for some months until they developed indications of marked malnutrition characterized by lesions in the mouth and along the gastro-intestinal tract. They found that the syndrome could be prevented and cured by food materials rich in carotin and finally showed that as little as 5 mg. daily of crystallized carotin was efficacious. In view of the well controlled conditions of the experiment, the results indicate an extraordinary potency of this pigment or some substance closely associated therewith and a definite need for it on the part of the organism. Experiments of a somewhat different nature, carried out with guinea-pigs, have been reported from Harvard.[2] In this case a solution of carotin in olive oil was injected intraperitoneally with the result that, at necropsy a month after the injections were begun, granulomatous lesions were found in the mesentery, on the spleen and on the liver. They were yellow fatty masses, and the whole phenomenon seemed characteristic of a foreign body type of reaction in the tissues. Small nodules were likewise seen on the under side of the omentum and seemed to follow the lymphatic vessels. A control animal injected with olive oil alone showed none of these reactions.

These two studies suggest several possibilities as explanation of the observed facts. There may be a specific difference between the two groups of animals.

---

[1] Underhill, F. P., and Mendel, L. B.: Am. J. Physiol. **83**: 589 (Jan.) 1928. An Experimental Deficiency Disorder, editorial, J. A. M. A. **90**: 1119 (April 7) 1928.

[2] Connor, C. L.: Am. J. Path. **4**: 227 (May) 1928.

drug should therefore be capable of disinfecting the skin efficiently within five minutes. It should also penetrate the epithelial débris that is always present. In order to do this, the solution should be capable of dissolving the fatty excretions of the skin and should therefore contain alcohol or some such solvent. The solvent should be of such a nature as to permit fairly rapid drying. It is important in preoperative skin disinfection that the substance used should stain the field in order that the treated area may be clearly defined. If a colorless solution is used there is always some doubt as to the exact extent of the area which has been covered. The disinfectant should not unduly irritate the skin of the patient. This is of great importance where the external genitalia and other sensitive regions have to be cleansed prior to operations. Many caustic and corrosive substances are excellent in killing bacteria, but, because of their severe action on the skin, they cannot be used. A great many postoperative infections have undoubtedly followed blistering by the disinfectant used in the preparation of the patient. It is desirable, finally, that the disinfectant should not be unduly toxic and should not precipitate proteins and albumins, since it frequently happens that the substance has to be instilled into the peritoneum in abdominal operations. Before judgment is passed on an antiseptic, all such points must be considered in addition to any results obtained in in vitro and laboratory

In addition to the green chlorophyll there occur in the leaves of plants two pigments, xanthophyll and carotin, which form yellow solutions. They can be found in other parts of the plant also and may be demonstrated in yellow corn, carrots and sweet potatoes. These pigments are similar in that their crystals are yellow, rose or copper colored with a metallic sheen. They differ in their solubilities and in their susceptibility to oxidation. Carotin is a hydrocarbon, while xanthophyll contains oxygen in addition to carbon and hydrogen. These pigments are always found together in plant and animal tissues, though in varying ratios. It has been shown that the carotin of milk fat, blood serum and adipose tissue of cattle is derived from the carotin-bearing food which they eat, while the xanthophyll, which predominates in egg yolk, in the skin of the legs of chickens and in their beaks, is present or largely absent in these structures depending on whether the fowls are given food containing xanthophyll or are provided with a ration lacking the pigment. There is a striking parallelism between the occurrence of vitamin A and these yellow pigments in nature, but careful studies have shown that neither purified xanthophyll nor carotin can replace this fat-soluble factor in the diet. The function of these commonly occurring pigments has come to be somewhat of a mystery.

Light has recently been thrown on the question by

Bro-Dart INDUSTRIES